A NEW GENUS OF PLETHODONTID SALAMANDER FROM MEXICO [1]

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Among the salamanders of the family Plethodontidae is a large and diversified group of terrestrial and arboreal species ranging from central Mexico southward through Central America and into northern South America. When the family was established by Gray in 1850, there appears to have been only one species *Bolitoglossa platydactylus* (Cuvier) recognized from this area. In the succeeding years many new species were added, until now there is a rather imposing list of approximately eighty-five well-established species.

During the last three decades such workers as E. R. Dunn, K. P. Schmidt, H. M. Smith, L. C. Stewart, E. H. Taylor, and others have added considerably to the numbers of specimens available in collections, to the numbers of new species, and to the general understanding of the southern segment of this family. Unfortunately, there has not been a unanimity of opinion concerning the numbers of genera that should be recognized among the Mexican and Central American lungless salamanders. Herpetologists appear, however, to have accepted, in a general way at least, the species as they are now established. This fact is particularly true in regard to that group of wormlike species belonging in the genus *Oedipina*. The relationships, however, of these wormlike species to other Mexican and Central American species, as well as an accepted generic interpretation of the *Oedipina* complex, has not been clearly formulated.

Dunn (1924:95 and again in 1926:434) considered the species *Oedipina parvipes* (Peters) as representing an interrelated species which broke down the distinction between the wormlike forms (genus *Oedipina*) and the rest of the Mexican and Central American species, which he includes in a single genus *Oedipus* Tschudi. Unfortunately Dunn did not list the interrelating characters he used to link the wormlike species with the normal forms.

Piatt, 1935, in his studies of the throat muscles of *Oedipina complex*, *Oedipina parvipes*, and *Oedipina uniformis*, found them to differ

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from all other species of the then accepted genus *Oedipus*. Piatt found the relationships of the *M. intermandibularis* to the *M. geniohyoideus* to show the greatest differences, and concludes by saying, "The presence of such a condition is another argument favoring a schism in the genus: the wormlike group reclaiming the name *Oedipina*."

Taylor, 1944:226, re-established the genus *Oedipina* Keferstein and included in it the same species listed by Dunn, 1926:33, in his group IV of the composite genus *Oedipina* Tschudi. In conclusion, Taylor suggested, "There is some doubt whether all the elongate wormlike forms of Mexico and Central America are congeneric with *uniformis* and *lineola*. The skeletal characters of most of the group are unknown and there is a probability that an examination of the skeletons will prove that more than a single genus is represented." In this study, Taylor failed to find the interrelating characters between the wormlike species *parvipes* and the other species from Mexico and Central America as suggested by Dunn.

In 1946 Dr. William A. Hilton collected a series of *Oedipina parvipes* and *Oedipina complex* from Barro Colorado Island, Canal Zone. After examining the skeletons of some of these and comparing them with those of other plethodontids, he described the genus *Oedopinola*. In previous studies Hilton had examined representatives of nearly all of the then known Mexican and Central American genera of plethodontid salamanders. Only *Parvimolge* and *Haptoglossa* appear not to have been seen by him. Hilton appears not to have seen the genotype *Oedipina uniformis* Keferstein, or any other typical *Oedipina* prior to his collecting the two Panamanian species, although *Spelerpes (Oedipina) lineola* Cope was examined. Presumably the description of the genus *Oedopinola* (1946:38) is based primarily on the difference existing between the skeletons of the two species collected in Panama and the wormlike species *lineola* from Mexico. The following from his description may aid in clarification, "but there are so many skeletal differences between them and members of the genus *Oedopina*[2] that a new generic name is suggested. This might be *Oedopinola*, a genus closely related to *Oedopina* but separated from it by the following differences: (1) Shorter vertebrae, (2) No alar folds on vertebrae, (3) Large number of vertebrae before the sacral, (4) Different carpus and tarsus."

Since Hilton had access to the work of Dunn (1926) and refers to the work of Taylor (1944), it is seemingly safe to assume that the statement "and other members of the genus *Oedopina*," is intended to

2 The generic term as used by Hilton is misspelled. It should read *Oedipina*.

include the following species of the genus *Oedipina: uniformis, elongatus, collaris, alfaroi,* and the atypical Mexican representative *Spelerpes lineola.* The term "them" obviously refers to the two Panamanian species *Oedipina parvipes* and *Oedipina* complex.

Recently I have had the rare opportunity to examine well over fifty species of Mexican and Central American Salamanders.[3] Among this number were the following species of the genus *Oedipina: uniformis, complex, parvipes, serpens, syndactyla, elongatus,* and two undescribed species from Central America. A comparison of the external and throat anatomy indicates a close relationship between the above listed Central American species of the genus *Oedipina.* I have found the typical species of *Oedipina* to be a very uniform group. I have not found, as yet, in either the external anatomy nor in the visceral cartilages and their associated muscles any indication of a characteristic that would link, through *Oedipina parvipes,* the genus *Oedipina* to the other plethodontid salamanders of Mexico and Central America.

On the basis of the external characters, the skeletal, and the throat anatomy, the genus *Oedopinola* is not tenable. A comparison of the two Panamanian species included in that genus by Hilton with the genotype *Oedipina uniformis,* shows a very similar set of characteristics. The throat myology and the hyobranchial appartus are the same in the three species. The verterbae are the same and with a similar number (nineteen or twenty) preceding the sacral. The external anatomy is also that of congeneric species.

When a typical *Oedipina* is compared with the Mexican species, *Spelerpes lineola* Cope, it is evident that Hilton had assumed *S. lineola* and *O. uniformis* to be similar, certainly congeneric species. A comparison of *S. lineola* with *O. uniformis* gives the same results as were obtained by Hilton in his comparison of *S. lineola* with *O. parvipes* and *O. complex.* It is therefore necessary to place the genus *Oedopinola* Hilton as a synonym under the genus *Oedipina* Keferstein and to place the species *Spelerpes lineola* Cope in a new genus to be known as

LINEATRITON W. W. Tanner, genus novum

GENOTYPE SPELERPES LINEOLA Cope. Plate I, figs. 1-10

Greatly elongate, slender-bodied terrestrial salamanders; tail cylindrical and in adults approximately twice as long as the combined

3 I desire to express my gratitude and thanks to Dr. Edward H. Taylor for the use of material and for helpful criticism and advice; also to Dr. William Hilton and the officials of the Museum of Comparative Zoology and the Chicago Museum of Natural History for the use of specimens.

length of head and body; fourteen costal grooves; arms and legs short, adpressed limbs separated by nine complete costal folds. Hands and feet incompletely webbed, basal phalanges grown together; the terminal and half of the adjoining phalanges of the two middle fingers and the three middle toes free. Snout short and broadly rounded; nostrils small; tongue entirely free, sublingual fold large and distinct; fifteen elongate body vertebrae, centra twice as long as wide, a broad, bony alar expansion extending caudad from the transverse processes, widest anteriorly and becoming narrower as it extends posteriorly; alar expansion absent on caudal and sacral vertebrae; caudal and sacral vertebrae with a crest on the haemal arch, crest serrate in the anterior and smooth in the more posterior caudal vertebrae; body vertebrae without a dorsal crest. Skull well ossified; frontal process of premaxilla single anteriorly and narrowly divided posteriorly. A single row of pleurodont teeth on maxilla increasing in size toward the premaxilla; premaxilla with large teeth in the male; proximal ends of the ceratohyals flattened, spatulalike, medially with two lobes, distally attenuate, hooked and attached to the squamosal by a ligament; second basibranchial absent. *M. intermandibularis anterior* present, no median raphè; *M. gularis* large, approxmiately one third of its insertion at the mid-ventral line; *M. quadrato-pectoralis* present, large, its origin on posterior edge of squamosal and dorsal tip of quadrate; *M. geniohyoideus medialis*, straplike, its origin on the posterior surface of mandible, approximately as wide at the origin as at the insertion; *M. geniohyoideus lateralis* undivided, origin simple, *M. rectus cervicis* in three unequal segments, posterior as long as both anterior segments, middle segment shortest.

A comparison of some of the pertinent characteristics existing in the genera of *Lineatriton* and *Oedipina* will give the more salient differences between the two genera.

PLATE I

Fig. 1. Lateral view of a caudal vertebra *Oedipina uniformis* Keferstein.
Fig. 2. Dorsal view of a trunk vertebra *Oedipina uniformis* Keferstein.
Fig. 3. Anterior end of a caudal vertebra *Oedipina uniformis* Keferstein.
Fig. 4. Lateral view of a trunk vertebra *Oedipina uniformis* Keferstein.
Fig. 5. Anterior end of a caudal vertebra *Lineatriton lineola* (Cope).
Fig. 6. Dorsal view of a trunk vertebra *Lineatriton lineola* (Cope).
Fig. 7. Lateral view of a trunk vertebra *Lineatriton lineola* (Cope).
Fig. 8. Anterior end of a trunk vertebra *Oedipina uniformis* Keferstein.
Fig. 9. Lateral view of a caudal vertebra *Lineatriton lineola* (Cope).
Fig. 10. Anterior end of a trunk vertebra *Lineatriton lineola* (Cope).

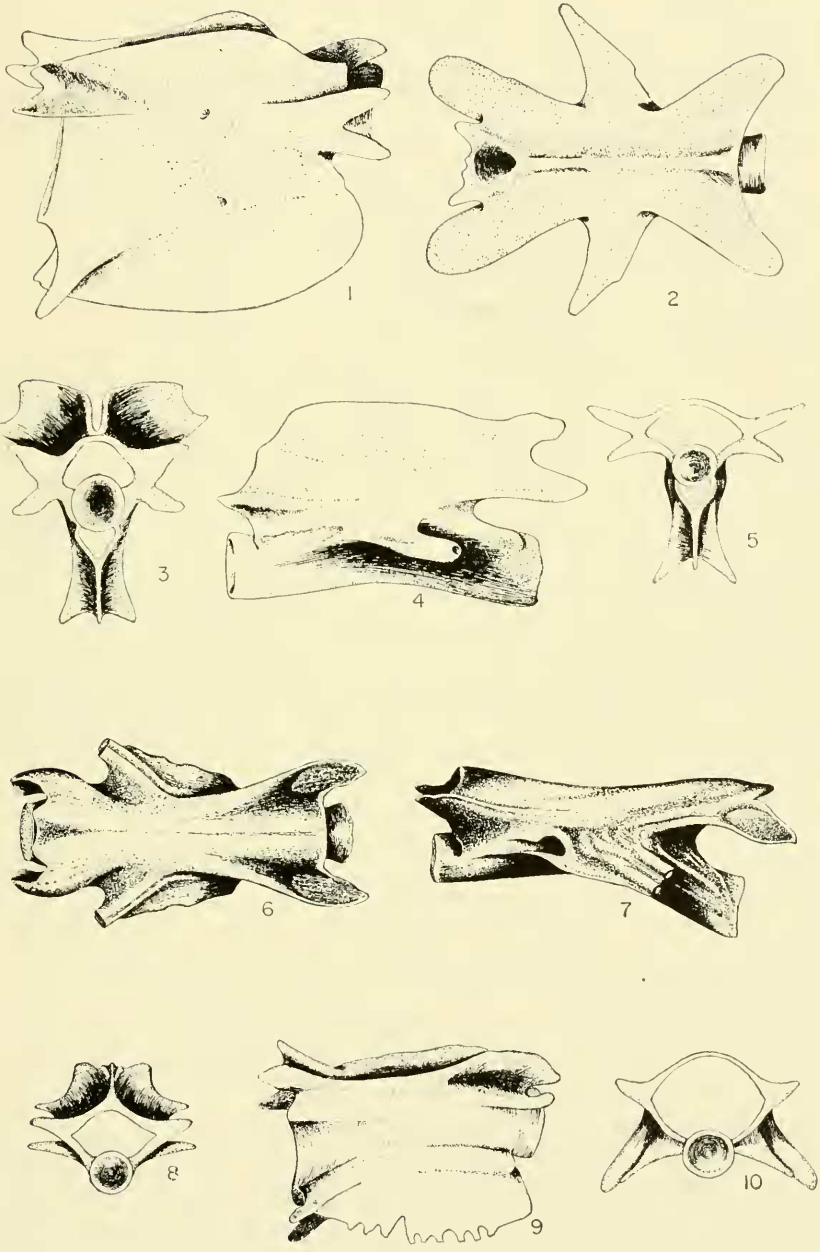

Plate I

Characters	Lineatriton	Oedipina
Costal grooves	14	17-20
Adpressed limbs covering	3-4 costal folds	5-8 costal folds
Phalanges	Middle fingers and toes incompletely webbed; terminal phalanges free.	Middle fingers and toes usually completely webbed or grown together; only the tips free.
No. of vertebrae	15 preceding the sacral	19-20 preceding the sacral
Characteristics of body vertebrae	Length of centrum twice its width; alar expansions present. No dorsal crest.	Vertebrae shorter, alar expansions absent; dorsal crest present.
Characteristics of caudal vertebrae	With a single medial dorsal crest; alar expansions absent; Haemal spine large, serrate in anterior and smooth in posterior vertebrae.	Two dorsal crests separated by a medial groove; alar expansions absent; haemal spine large, not serrate.
Ceratohyals	Proximal end spatulalike, with a median lobe.	Proximal end attenuated, rodlike; without a median lobe.
M. genohyoideus medialis	Origin on posterior surface of mandible; broad straplike.	Origin on ventral and posterior surfaces of mandible; narrow anteriorly, expanding caudally, not straplike.
M. genohyoideus lateralis	Origin on posterior surface of mandible, anterior to origin of intermandibularis anterior.	Origin on ventral surface of mandible, divided by intermandibularis anterior and the anterior slip of the posterior muscle.
M. rectus cervicis	In three unequal segments posterior segment as long as combined lengths of other two segments.	In three nearly equal segments, posterior segment only slightly longer than middle or anterior segments.
M. quadrato-pectoralis	Origin on posterior surface of squamosal and on tip of quadrate.	Origin on posterior and ventral surfaces of squamosal and on skull ventral to the squamosal.

Remarks: The genus *Lineatriton* is more closely allied to the genera *Pseudoeurycea*, *Chiropterotriton*, and *Parvimolge* than it is to the genus *Oedipina*. The relationships are more clearly seen in the throat anatomy, although the reduced numbers of vertebrae and costal grooves are also relating characteristics. The new genus is distinct from either *Pseudoeurycea* or *Chiropterotriton* by reason of the character of limbs, the entirely different type of feet, short legs, and the greatly elongate body and tail. It is distinct from the genus *Parvimolge* in having small nostrils in the adults, although young animals may have enlarged nostrils, short legs, and greatly elongate body and tail. The

elongate tail which is responsible for the resemblance between the genera *Oedipina* and *Lineatriton* has also been attained by another distantly related genus *Batrachoseps*.

In some genera of plethodontid salamanders there is a transverse chin groove extending across the throat anterior to the gular fold and beginning near, but usually located posterior to, the angle of the jaw. This chin groove is present in both *Oedipina* and *Lineatriton*. However, on the underside of the throat of all *Oedipina*, at least those which I have seen, there is a fine arched groove resting on the transverse chin groove. The arched groove extends anteriorly and curves mesiad to the mid-ventral line where the grooves on each side usually meet, immediately ventrad to the M. intermandibularis anterior. This character is lacking in *Lineatriton lineola*.

The relationship between *Lineatriton* and *Oedipina* is seemingly remote, except that both genera are composed of greatly elongate, free-tongued species. Their similarities are few, and both genera are represented by highly specialized species. This fact is particularly true of the genus *Oedipina*, in which there has been an increase in the number of body vertebrae, rather than an elongation, as in *Lineatriton;* the vertebrae, as indicated above, have been specialized; the fingers and toes are more completely webbed or grown together, and there is a noticeable specialization in the muscles and cartilages of the throat region. Equally important is the uniformity in the throat anatomy among the species of *Oedipina*.

The generic relationships suggest an adaptive radiation for Mexico, in which the genera *Pseudoeurycea*, *Chiropterotriton*, *Parvimolge*, and *Lineatriton* arose from a primitive stock, which may have been similar to *Pseudoeurycea*. The entire anatomical arrangement of the hyobranchial apparatus and its musculature is reminiscent of such a general relationship. The presumed relationship between *Lineatriton lineola* and the genus *Oedipina* turns out to be only superficial resemblance. Evidences certainly do not suggest an origin from a common prototype, but imply that the similarities are a result of convergence.

Range: The new genus is known only from central Veracruz, where it ranges between the altitudinal limits of two to four thousand feet. Whether the genus *Lineatriton* will be found to occupy a wider range must await further intensive collecting. The distribution of the genus *Oedipina* is at present restricted to the countries of Central America, although its range may be found to extend into southern Mexico. The known ranges of the two genera are at present widely separated.

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